WE CLAIM:

1. A system for determining temperature from a remote sensor that includes a PN junction, comprising:

a programmable current circuit that is coupled to the remote sensor circuit such that the programmable current circuit provides a bias current to the PN junction when activated, wherein the bias current has an associated level that is selected from at least a first current level and a second current level;

a first control signal that is applied to the programmable current source at a first time such that the associated level of the bias current at the first time corresponds to the first current level;

a second control signal that is applied to the programmable current source at a second time such that the associated level of the bias current at the second time corresponds to the second current level;

a third control signal that is applied to the programmable current source at a third time such that the associated level of the bias current at the third time corresponds to the second current level;

a fourth control signal that is applied to the programmable current source at a fourth time such that the associated level of the bias current at the fourth time corresponds to the first current level;

a converter that includes an input that is coupled to the remote sensor, and an output that is configured to provide values that correspond to a voltage across the PN junction at the first, second, third, and fourth times; and

a processor that is coupled to the output of the converter, wherein the processor calculates a temperature value in response to the values that are produced at the first, second, third, and fourth times.

2. The system of claim 1, the processor comprising:

a first average calculator that is arranged to provide a first average in response to the values from the first and fourth times;

a second average calculator that is arranged to provide a second average in response to the values from the second and third times; and

a temperature calculator that is arranged to calculate the temperature value in response to the first and second averages.

3. The temperature sampling system of claim 2, the first average calculator further comprising:

an adder that is arranged to provide a sum of the values from the first and fourth times; and

a divider that is arranged to provide the sum temperature value by dividing the sum of the values by a factor equal to the number of the values from the first and fourth times.

4. The temperature sampling system of claim 1, the processor further comprising:

a first subtracter that is arranged to provide a first difference in response to the values from the first and second times;

a first temperature calculator that is arranged to provide a first initial temperature in response to the first difference;

a second subtracter that is arranged to provide a second difference in response to the values from the third and fourth times;

a second temperature calculator that is arranged to receive the second difference as an input and provides a second initial temperature as an output in response to the second difference; and

an average calculator that is arranged to calculate the temperature value in response to the first and second initial temperatures.

5. The system of claim 4, the average calculator further comprising:

an adder that is arranged to provide a sum of the first and second initial temperatures; and

a divider that is arranged to provide the temperature value by dividing the sum of the first and second initial temperatures by a factor of two.

6. The system of claim 1, the programmable current circuit further comprising a first current source that is arranged to selectively produce the first current level and a second current source that is arranged to selectively produce the second current level.

7. The system of claim 1, the programmable current circuit further comprising a plurality of current sources that are configured to selectively produce the first and second current levels.

8. The system of claim 7, wherein the programmable current circuit is configured to selectively enable one of the plurality of current sources to produce the first current level, and also configured to selectively enable all of the plurality of current sources to produce the second current level.

9. The system of claim 8, wherein the programmable current circuit is arranged to enable each of the plurality of current sources at different times.

10. The system of claim 7, wherein a selected one of the plurality of current sources is selected for the first current level and the second current level.

11. The system of claim 1, wherein the first current level and the second current level are related to one another by a ratio having a value that is greater than one.

12. The system of claim 1, wherein the converter is configured to oversample the voltage across the PN junction at the first, second, third, and fourth times such that a multiplicity of output codes are produced for each of the first, second, third, and fourth times.

13. The system of claim 1, further comprising:

a first difference between the first and second times;

a second difference between the second and third times; and

a third difference between the third and fourth times such that each of the first, second, and third difference is substantially equal to one another.

14. A method of determining a temperature from a remote sensor, comprising:

producing a first current level;

producing a second current level that is different from the first current level;

applying a sequence of the first and second current levels to the remote sensor circuit at a first time, wherein the sequence is selected from a random sequence, a pseudorandom sequence, and an ordered sequence, wherein the ordered sequence comprises a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time;

measuring first voltages from the remote sensor circuit when the first current level is applied;

measuring second voltages from the remote sensor circuit when the second current level is applied;

determining a temperature value from the first and second measured voltages.

15. The method of claim 14, wherein the temperature value is calculated by:

determining a first average using the first measured voltages;

determining a second average using the second measured voltages; and

using the first and second averages to calculate the temperature value.

16. The method of claim 14, wherein the temperature value is calculated by:

determining a first difference between the first and second measured voltages when the first current level applied followed by the application of the second current level;

determining a second difference between the first and second measured voltages that occur upon the change from applying a second current level to applying a first current level; and

calculating the temperature value from the first and second differences.

17. The method of claim 14, wherein the method for applying the sequence of the first and second current levels further comprises applying a third current level to a remote sensor circuit and wherein the steop of determining the temperature value further comprises determining the temperature value from the third current level.

18. The method of claim 14, further comprising applying the sequence to the remote sensor circuit at a second time, wherein a second current source is used at the second time to apply a current for the lesser of the first and second current levels, wherein the second current source is different from a first current source that is used at the first time to apply a current for the lesser of the first and second current levels.

19. A method of determining a temperature from a remote sensor, comprising:

means for producing a first current level;

means for producing a second current level that is different from the first current level;

means for applying a sequence of the first and second current levels to the remote sensor circuit, wherein the sequence is selected from a random sequence, a pseudorandom sequence, and an ordered sequence, wherein the ordered sequence comprises a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time;

means for measuring first voltages from the remote sensor circuit when the first current level is applied;

means for measuring second voltages from the remote sensor circuit when the second current level is applied;

means for determining a temperature value from the first and second measured voltages.

20. The method of claim 19, wherein the temperature value is calculated by:

means for determining a first average using the first measured voltages;

means for determining a second average using the second measured voltages; and

means for using the first and second averages to calculate the temperature value.

21. The method of claim 19, wherein the temperature value is calculated by:

means for determining a first difference between the first and second measured voltages when the first current level applied is followed by the application of the second current level;

means for determining a second difference between the first and second measured voltages that occur upon the change from applying a second current level to applying a first current level; and

means for calculating the temperature value from the first and second differences.

22. The method of claim 19, wherein the means for applying the sequence of the first and second current levels further comprises means for applying a third current level to a remote sensor circuit and wherein the means for determining the temperature value further comprises means for determining the temperature value from the third current level.